Computer experiment 2 (Ch4, Ch5, [Alpaydin 2020])

1. (#1, p90, Ch4) Write the code that generates the Bernoulli samples $X = \{x_1, \dots, x_N\}, x_i \in \{0,1\}$ with (a) $p = 0.25, N = 1000$, and (b) $p = 0.5, N = 1000$; and the code that calculates the estimate $\hat{p}_{ML}$ from the sample X.

2. (#2, p114, Ch5) Write the code that generates the 2-D normal samples $X = \{\mathbf{x}_1, \dots, \mathbf{x}_N\}, \mathbf{x}_i \in R^2$ with (a) $\boldsymbol{\mu} = [1,1]^T, \boldsymbol{\Sigma} = \begin{bmatrix} 5 & 3 \\ 3 & 4 \end{bmatrix}, N = 1000$, and (b) $\boldsymbol{\mu} = [10,5]^T, \boldsymbol{\Sigma} = \begin{bmatrix} 7 & 4 \\ 4 & 5 \end{bmatrix}, N = 1000$; and the code that calculates the estimates $\widehat{\boldsymbol{\mu}}_{ML}, \widehat{\boldsymbol{\Sigma}}_{ML}$ from the sample X.